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**POCKET GUIDE
TO
ALASKA TREES**



**MISCELLANEOUS PUBLICATION 55
U.S. DEPARTMENT OF AGRICULTURE**

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POCKET GUIDE
TO
ALASKA TREES

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FOREWORD

The need of a nontechnical booklet describing Alaska tree species has long been felt, and is the reason for the publication of this pocket guide.

Alaska has 28 species that are known to attain tree size and form. All are described in the following pages. Both the scientific and common names for these species except *Salix bebbiana* are taken from Sudworth's Check List of the Forest Trees of the United States.¹ Many standard books, as well as information on file in the office of the Forest Service, have been referred to for descriptive matter. Sudworth's Forest Trees of the Pacific Slope,² Sargent's Manual of the Trees of North America,³ J. R. Anderson's Trees and Shrubs, Food, Medicinal, and Poisonous Plants of British Columbia,⁴ and Henry's Flora of Southern British Columbia⁵ were of especial value.

Except in a few cases the drawings are from specimens collected in Alaska. For the species for which Alaskan specimens were not available the drawings were made from illustrations found in the books mentioned above. The range map of Alaska trees was compiled from very inadequate data and is subject to revision as more information becomes available. The map in Volume II of Zon and Sparhawk's Forest Resources of the World⁶ was used as a base to which was added information obtained from personal knowledge of individuals, bulletins of the United States Geological Survey, and reports of the Alaska-Canadian Boundary

¹ SUDWORTH, G. B. CHECK LIST OF THE FOREST TREES OF THE UNITED STATES, THEIR NAMES AND RANGES. U. S. Dept. Agr. Misc. Circ. 92, 295 p. 1927.

² ——— FOREST TREES OF THE PACIFIC SLOPE. 441 p., illus. Washington [D. C.] 1908.

³ SARGENT, C. S. MANUAL OF THE TREES OF NORTH AMERICA (EXCLUSIVE OF MEXICO).

⁴ ANDERSON, J. R. TREES AND SHRUBS, FOOD, MEDICINAL, AND POISONOUS PLANTS OF BRITISH COLUMBIA. 165 p. illus. Victoria, B. C. 1925.

⁵ HENRY, J. K. FLORA OF SOUTHERN BRITISH COLUMBIA AND VANCOUVER ISLAND, WITH MANY REFERENCES TO ALASKA AND NORTHERN SPECIES. 363 p. Toronto. [1915.]

⁶ ZON, R., and SPARHAWK, W. N. FOREST RESOURCES OF THE WORLD. 2 v., illus. New York. 1923.

Survey. For the national forest portions, Forest Service timber-cover data were consulted.

The key for the identification of Alaska trees is intended to bring out certain features wherein species or groups of species differ from each other. Descriptions of individual trees contained in the text itself show for each species the one or two outstanding characteristics by which it can almost invariably be identified.

No thorough-going study has ever been made of the Alaska habits of many of the trees; and no claim is made to a complete or perfect presentation here of range or habitat preference. It will be appreciated if those using this booklet will report corrections, particularly regarding range of trees, to the Forest Service at Juneau, Alaska.

Grateful acknowledgment is made to J. P. Anderson of Juneau, for criticism and correction of the manuscript, and to L. J. Palmer, of College, Alaska, for correction of the tree-range map and for other assistance.

THE FORESTS OF ALASKA

Alaska's 573,000 square miles of land is covered by three general types of vegetation, which are determined, roughly speaking, by variations in climate and soil. These are the spruce-birch forests of the interior; the nonforested tundra and grassland of the Arctic and Bering Sea slopes; and the dense hemlock-spruce forests of the coast.

COASTAL FORESTS

Covering the Pacific side of the Alaska Range, a humid region of mild climate and heavy precipitation, dense forests of hemlock and spruce extend from the southeastern tip of the Territory north and west along the coast to the vicinity of Kodiak. These forests are approximately 70 per cent hemlock, 25 per cent spruce, and 5 per cent western red cedar, Alaska cedar, and other species. They are of immense economic importance, for they cover a region the best use of which is for timber production, the land having little agricultural value. They are almost all within the Tongass and Chugach National Forests, which are under scientific forest management. This means that the forests are handled as a crop, the annual cut of timber never exceeding the annual growth, and permanent wood-using industries being thus provided for. Obviously, these coastal forests will contribute greatly to the permanent welfare and prosperity of the people just as soon as economic conditions permit the full development of wood-using industries. At the present time only a small fraction of the potential growth is utilized.

INTERIOR FORESTS

Light rainfall, usually 10 to 16 inches annually, and severe winters characterize the spruce-birch interior region, which abounds in river valleys and wet flats. The region is bounded on the south by the Alaska Range and extends north and west to the Arctic tundra and grassland. Stands are light and trees compara-

tively small and scattered, with white spruce on the better sites, black spruce on the wet, swampy flats, and cottonwood, aspen, and willows on river bottoms and burns, as well as in mixture with the spruce. The forest becomes sparse and open away from the water courses, as is indicated on the range map following last page.

The interior forests at present supply local needs for house logs, mining, agriculture, and to some extent for sawed lumber. The birch timber appears to be satisfactory for cabinet and general uses, and it is probable that a considerable commercial export of this product may be developed from the more accessible regions. Too little is known of the extent and amount of timber in the interior forests generally to venture any prediction regarding future commercial possibilities. Eastern Canada and some northern European countries, however, have built up industries on timberlands which support very light and scattered stands of timber, and it is very possible that as the pinch of timber shortage is felt the interior forests of Alaska will be utilized, particularly where they are tributary to streams that will afford cheap and easy means of transportation to a central plant.

NONFORESTED AREAS

The nonforested parts of Alaska comprise treeless tundra and grassland. The grassland areas occur over the Alaska Peninsula, the Aleutian Islands, and the south slopes of the Alaska Range; the tundra, over the vast treeless section bordering the Bering Sea and Arctic Ocean and lying north of the Brooks Range.

The grassland cover includes an abundant mixture of grasses and weeds, often waist high in summer, with a minor admixture of low, vinelike or trailing shrubs.

The average composition of the tundra cover throughout is about 30 per cent lichens, 25 per cent sedges, 25 per cent shrubs, and 20 per cent grasses, weeds, and mosses. Three main vegetative types are recognized; namely, wet tundra, dry tundra, and rocky or ridge areas. The wet and dry tundra areas are of heavier plant cover than the ridge areas, usually running 100 per cent in cover and density, whereas the rocky or ridge type of the mountainous regions includes a larger proportion of lichens, grasses, and weeds. The wet-tundra type comprises chiefly cotton sedges, low or bog

shrubs and lichens, but the dry-tundra type runs more to the larger shrubs, grasses, weeds, and black sedges.

The wet tundra is the most extensive type and occurs over most of the rolling, prairie like range immediately bordering the Bering Sea and Arctic Ocean, interspersed with areas of dry tundra on the better drained slopes and along stream courses.

IMPORTANCE OF FIRE PREVENTION

Naturally a country of such light rainfall as interior Alaska, with no organized means of fire protection, is subject to devastating forest and tundra fires which destroy game, birds, and fur bearers and their homes and sources of food supply, and affect the prospector and trapper adversely. A vast resource in the way of an abundant and luxurious plant growth, which could be utilized through the development of the grazing of game animals and of the ranging of livestock, is now going to waste and in many places is being destroyed by fire.

The lichens, the mainstay of reindeer herds in winter, take from 15 to 40 years to reestablish themselves after a fire. And forested areas that have been burned over take many more years to produce a new crop of trees than is required in milder climates.

It is a peculiar fact that practically all forest and tundra fires are man-caused, and therefore preventable. Since the interior has at present no organized fire-protection agencies, losses can be reduced only by the whole-hearted cooperation of those who go abroad in forest and tundra.

KEY FOR IDENTIFICATION OF ALASKA TREES

I. *Trees with needlelike foliage.*

A. Foliage shed during winter.

1. Needles in bundles of 12 to 20 except on leading branches, where they are scattered singly. Three-fourths inch to 1¼ inches long.

TAMARACK (p. 10)

AA. Foliage not shed during winter. (All other Alaska conifers.)

1. Stiff, sharp, pointed needles without leafstalks, scattered singly on branches, usually 4-angled in cross section and standing out on all sides. Cones pendulous. Branchlets roughened by persistent leaf bases.

THE SPRUCES (p. 12)

2. Needles blunt, soft, with short stalks, scattered singly on slender branches, drooping at tips. Branchlets roughened by persistent leaf bases. Cones pendulous.

THE HEMLOCKS (p. 14)

3. Needles thick, without stalks, sometimes notched at ends, occurring singly on branches. Branchlets not roughened by leaf bases. Cones erect with scales falling from axis when mature.

THE FIRS (p. 16)

4. Needles in clusters of two; very occasionally three; dark green, 1 to 3 inches long. Cones usually not over 2 inches long with recurved prickles.

LODGEPOLE PINE (p. 10)

5. Needles glossy, occurring singly on two sides of branches, one-half to five-eighths inch long, dark yellow green, comb-like appearance. Fruit a red berry. Confined to southern southeastern Alaska.

PACIFIC YEW (p. 20)

II. *Trees with scalelike foliage.*

- A. Scalelike leaves arranged end to end, forming flat sprays. The leaves one-eighth to one-fourth inch long, flattened or rounded.

THE CEDARS (p. 19)

III. *Trees with broad-leaved foliage, deciduous.*

A. Leaves alternate.

a. Leaves simple.

1. Leaves long, more or less pointed, short stalked, usually entire. Buds covered by a single scale. Bark has bitter, quininelike taste.

THE WILLOWS (p. 24)

2. Leaves ovate to lanceolate, long stalked, dentate. Winter buds resinous, with several thin scales. Bark pale and furrowed.

THE POPLARS (p. 22)

3. Leaves ovate, coarsely serrate, minutely pubescent or hairy on upper surface, pale yellow beneath; $1\frac{1}{2}$ to 3 inches long, 1 to $1\frac{3}{4}$ inches wide. Bark thin, reddish brown to nearly white, peeling in layers around the tree.

THE BIRCHES (p. 28)

4. Leaves lobed, serrate, 3 to 6 inches long by $1\frac{1}{2}$ to 4 inches wide, with stout petioles. Fruit, a cone one-half to three-fourths inch long and three-eighths inch thick. Bark, light gray; winter buds, dark red.

THE ALDERS (p. 30)

5. Leaves ovate-lanceolate, sometimes 3-lobed, 1 to 3 inches long by one-half to $1\frac{1}{2}$ inches wide, with stout, rigid petioles. Fruit, an apple less than 1 inch in diameter. A small tree with red-brown bark covered with slatelike scales.

OREGON CRAB APPLE (p. 32)

aa. Leaves compound.

Leaves composed of 7 to 17 serrate leaflets seldom over 2 inches long. Fruit, a cluster of red berries.

THE MOUNTAIN-ASH (p. 34)

AA. Leaves opposite.

a. Leaves simple.

THE MAPLES (p. 36)

Lodgepole Pine.*Pinus contorta.*

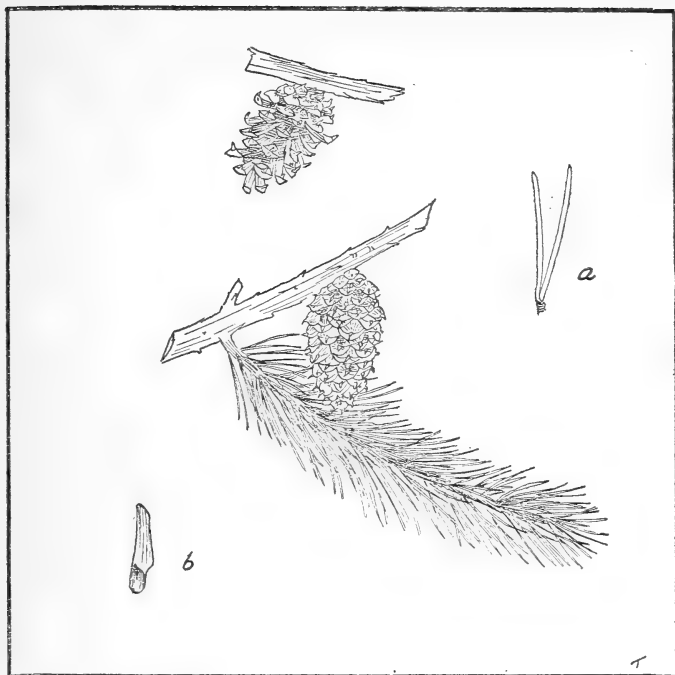
Leaves two in a bundle, 1 to 3 inches long, dark green and slender. The **cones**, usually not over 2 inches in length, often persist on the branches several years, remain closed long periods, and are capable of withstanding excessive heat. **Bark** thin, blue brown, deeply furrowed. **Wood** pitchy, coarse-grained, hard and brittle, used only for fuel and minor purposes in Alaska. The sweet orange-flavored sap has been used by the natives as a delicacy.

Lodgepole, our common scrub and only pine, is found in open muskegs, on benches near lakes throughout southeastern Alaska, and in the interior along the Yukon River in Canada and probably overlapping westward into Alaska to 64° north. It is intolerant of shade and grows in open stands, and its branches extend almost to the ground. It averages 20 to 40 feet in height and 6 to 20 inches in diameter, probably reaching an age of 100 to 125 years.

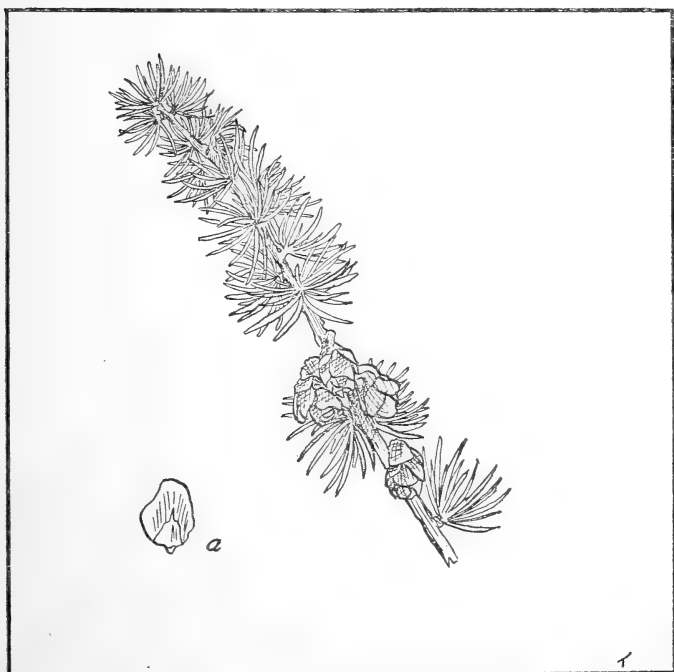
Tamarack.*Larix laricina.*

Leaves deciduous, in clusters of 12 to 20, approximately 1 inch long. **Cones** one-half to three-fourths inch long, produced at 12 to 20 years, maturing in early fall. **Bark** ashy brown; winter twigs a dull tan color. **Wood** hard, heavy and elastic. Tamarack is used to some extent for poles, ties, and fence posts.

Tamarack is found in the lower Yukon, upper Koyukuk, Tanana, and upper Kuskokwim River Valleys, extending north to 67°, south to 63°, and west to 160° on Unalakleet River, and at elevations up to 1,650 feet. It grows in muskegs and moist soils of almost any type, in open stands with cottonwood, black spruce, alder, and willow. It is a small hardy tree capable of withstanding great changes in temperature, and in Alaska is the only conifer shedding its leaves in winter. It seldom exceeds 6 inches in diameter, and has a straight, tapering trunk, thin crown, and horizontal branches which usually extend to the ground.



Lodgepole pine (*Pinus contorta*). *a*, Leaf bundle, enlarged; *b*, seed, enlarged



Tamarack (*Larix laricina*). *a*, Cone scale, enlarged

Black Spruce.*Picea mariana.*

Leaves blue-green, ashy, standing out on the branches, shorter and blunter than white spruce. **Cones** ovate, one-half inch to 1½ inches long, remaining on the trees for years, often conspicuously clustered in the tops. Bark thin and composed of gray-brown scales. **Wood** fine-grained but seldom used because of the small size of the tree. Branches short, sparse, often drooping slightly at the ends.

Black spruce is found in the interior of Alaska as a small tree, on cold, wet flats, bogs, and lake margins, often scrubby and ranging from a few feet to 12 or 15 feet tall. From the inland slopes of the coast mountains it ranges north and west, climbing at times to 2,000 feet elevation. It is also found in Cook Inlet and may come over the range at other inlets and bays.

White Spruce.*Picea glauca.*

Leaves stiff, pointed, 4-angled, and standing out on all sides of twigs except near the ends where they mass on top. **Cones** 1 to 2½ inches long, red tinged, maturing in one year, turning a light brown after falling in the autumn. **Bark** thin, in small scales. **Wood** soft, fine, and straight-grained. The tree is characterized by a wide conical crown, drooping branches with upturned ends, and numerous small, drooping side branchlets. Larger trees of this species supply most of the locally sawed lumber of interior Alaska.

White spruce ranges north to 68° and west to the mouth of the Yukon and upper Fish River on Seward Peninsula, reaching the Pacific side of the coast range at Cook Inlet and some other bays and inlets. It is not reported on the Arctic slope.

It is not exacting as to habitat but does best on sandy soils along the edges of lakes and rivers, thriving under the light shade of poplars and birches, which it often replaces after fire or logging.



T

Black spruce (*Picea mariana*). a, Seed, enlarged



T

White spruce (*Picea glauca*). a, Seed, enlarged

Sitka Spruce.

Picea sitchensis.

Leaves thin, roughly angled, sharp pointed, and standing out from all sides of the branches. **Cones** about 3 inches long, pendulous. **Bark** dark purplish brown, scaly, the inner cork white with brown dots. **Wood** soft, medium-grained, and light, making admirable saw timber. Resonant qualities make the wood valuable for piano sounding boards, its suitability for airplane manufacture is well known. It makes a high-grade pulp, and with western hemlock will no doubt be used extensively in the manufacture of newsprint in the future.

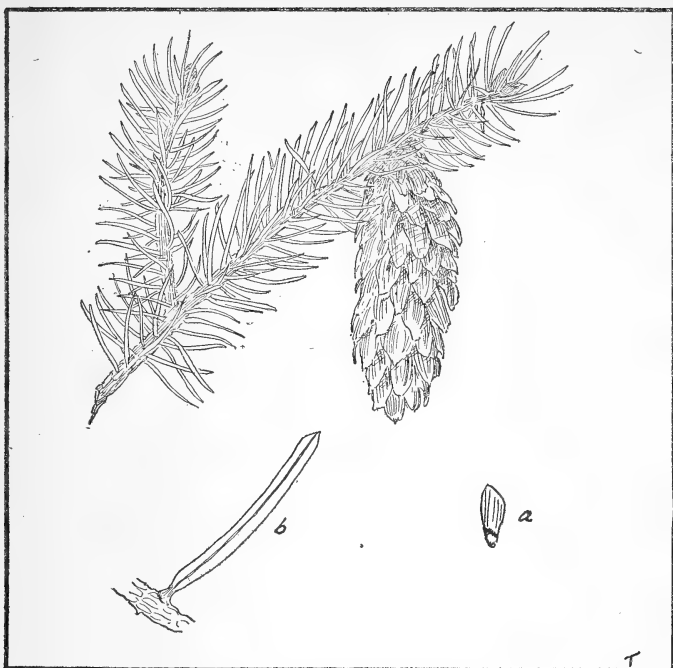
This, the common spruce of the coastal forests of Alaska from Cook Inlet east and south, is the most valuable Alaskan tree. With tall, evenly tapering stem and open conical crown, it attains a height of 160 feet or more and a diameter of over 8 feet on the best sites, which are moist, deep, rich, and well-drained soils.

Western Hemlock.

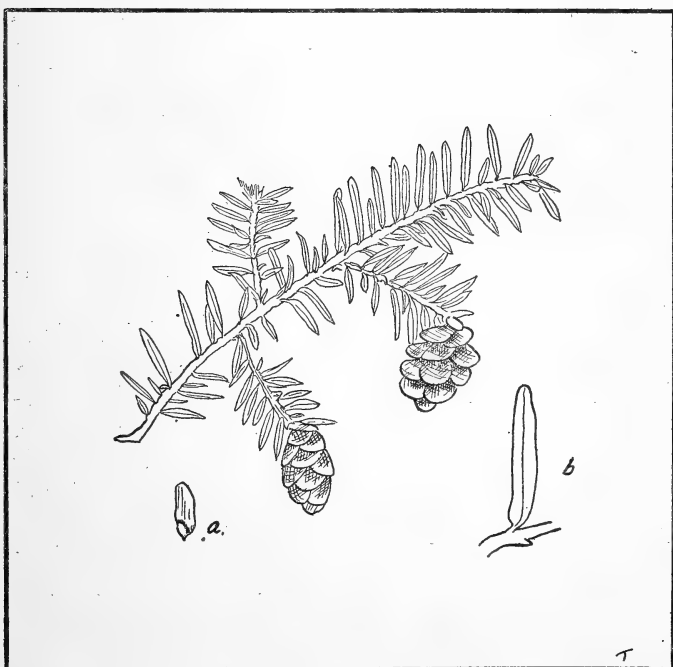
Tsuga heterophylla.

Leaves flat, rounded at tips with a whitish under surface which distinguishes the tree from mountain hemlock. Needles one-fourth to seven-eighths inch long. **Cones** not over 1 inch long, occurring on the tips of branches. **Bark** hard, furrowed, and thick on old trees. A pocketknife will disclose a red inner bark not found in spruce. The outer bark contains a high percentage of tanning and the inner bark has been used as a food by the Indians. **Wood** stronger and more durable than other species of American hemlocks, easily worked, used for construction, paper pulp, and piling. It is admirably suited for structural timbers, flooring, and street planking, and every effort should be made to overcome the prejudice against its use for these purposes.

Western hemlock forms some 70 per cent of the coastal forests of Alaska. It attains its largest size on moist flats and lower slopes, but with abundant moisture, both atmospheric and soil, it will do well on shallow soils, averaging 125 feet in height and 30 inches in diameter.



Sitka spruce (*Picea sitchensis*). a, Seed, enlarged; b, leaf, enlarged



Western hemlock (*Tsuga heterophylla*). a, Seed, enlarged; b, leaf, enlarged

Mountain Hemlock.*Tsuga mertensiana.*

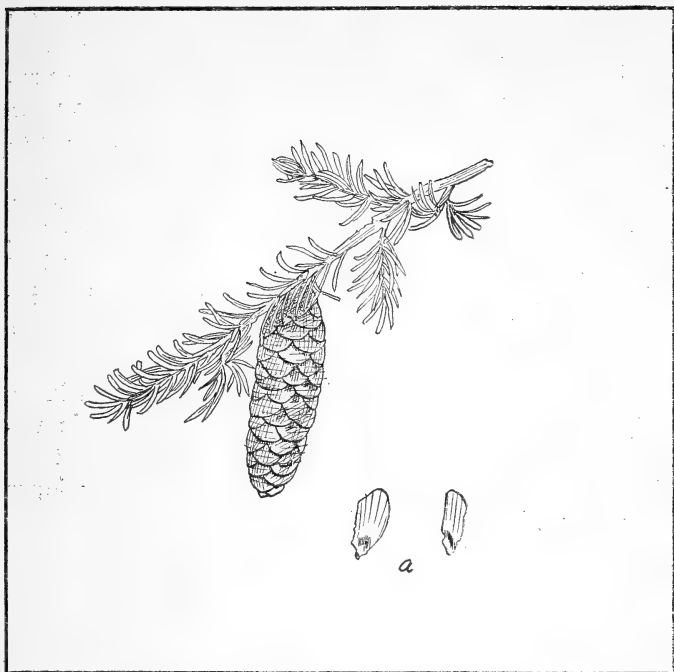
Leaves with typical distinct leaf stem and growing from all sides of twig, plumper and blunter than western hemlock and lacking the ashy under surface. **Cones** about 2 inches long and three-fourths inch thick when mature, usually pendulous. **Bark** blue-gray, deeply furrowed and ridged. **Wood** fine-grained soft, and light, used for railroad ties in the Cook Inlet region, where mountain hemlock grows close to tidewater and partly loses its dwarfed appearance.

Mountain hemlock grows in low muskegs as well as on alpine slopes on the ocean side of the coast range from Dixon's entrance to Cook Inlet. In the region of Cook Inlet it appears on better drained slopes with better form. It is usually short, from 30 to 60 feet tall, and 10 to 20 inches in diameter, with marked taper; on better sites it may reach 100 feet in height, with a corresponding increase in diameter.

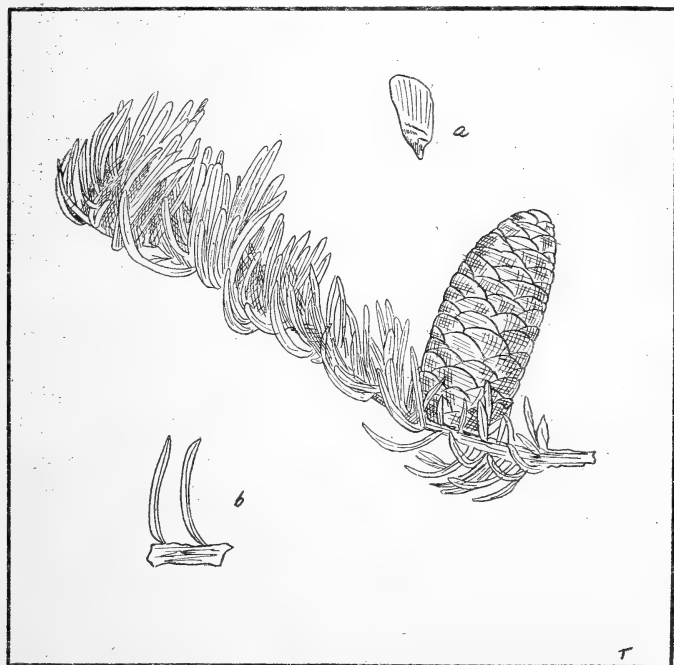
Alpine Fir.*Abies lasiocarpa.*

Leaves dark green, long, flat, and blunt on the lower branches, pointed and stiff near the top, where they mass themselves on the upper sides of the twigs. **Cones** 2½ to 4 inches long and 1½ inches in diameter. Cone scales fall from central stalk at maturity, so that old cones are not found on or under trees. **Bark** ash gray, thin, hard, and flinty. **Wood** fine-grained and soft, but usually knotty because of the many persistent branches.

The tree grows in the cool, moist subalpine slopes near timber line, although it is found in the valley floors as well. A long spirelike crown is characteristic. Occurring largely on the east side of the coast range in Canada and southeastern Alaska, Alpine fir crosses the divide at Lynn Canal, and may be found at sea level near Chilkoot and White Pass, through the Cooper River Valley and eastward, also at Very Inlet, head of Portland Canal, and Boca de Quadra.



Mountain hemlock (*Tsuga mertensiana*). a, Seed, enlarged



Alpine fir (*Abies lasiocarpa*). a, Seed, enlarged; b, leaf arrangement

Silver Fir.

Abies amabilis.

Leaves deep green above, whitish beneath, notched at the tips on the lower branches, and deeply grooved. A peculiar twist brings the needles in a brushlike mass on the upper sides of the branches. As the top of the tree is approached the needles become shorter and sharper. **Cones** bluish tinged, 4 to 5 inches long, standing erect on the branches, scales falling when mature. **Bark** smooth, gray, characteristically spotted with white. **Wood** soft, occasionally used for interior finish in Washington and Oregon, where it grows more abundantly than in Alaska.

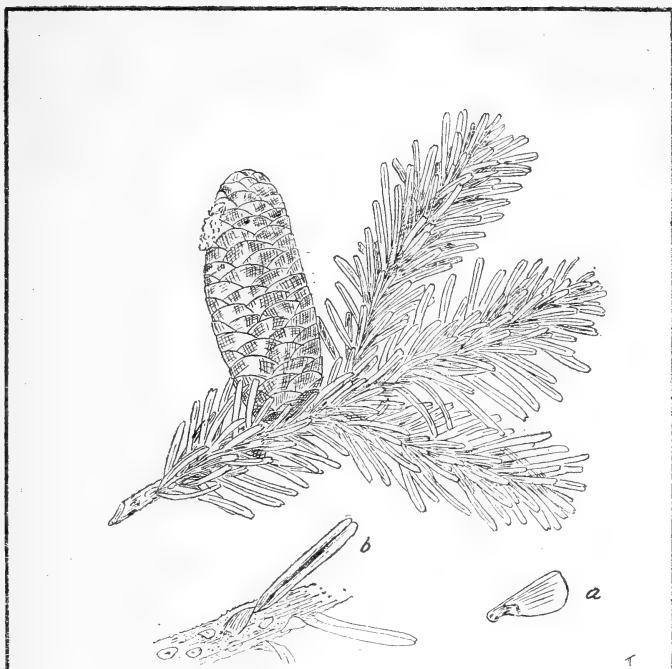
Silver, or amabilis (beautiful) fir is found in Alaska only from sea level to elevations of 1,000 feet in the region of Boca de Quadra and to some extent on Portland Canal. It occurs on well-drained lower slopes of canyons, benches, and flats.


Western Red Cedar.

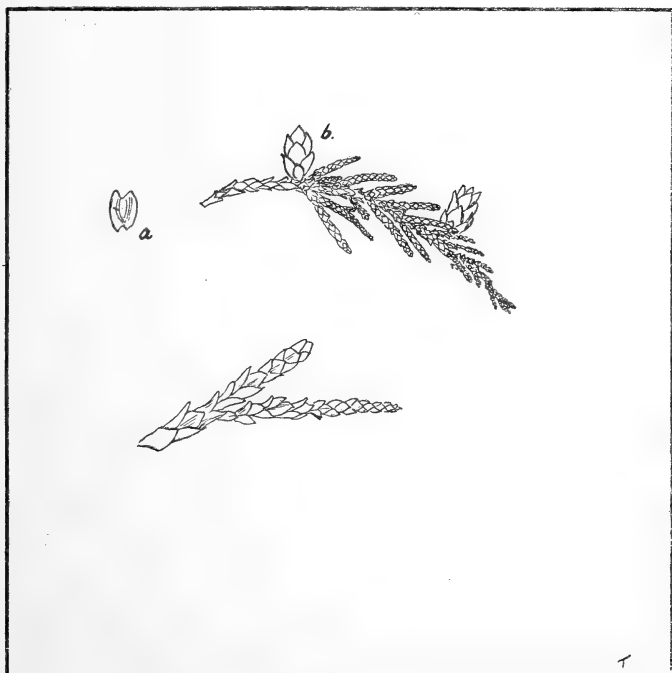
Thuja plicata.

Leaves made up of small scales arranged on tiny branchlets which compose flat, fanlike sprays, glossy above, dull below. The smooth, rounded leaflets differ from the more prickly Alaska cedar leaflets. **Cones** about one-half inch long, brown and tough. Bark in youth gray brown, thin and stringy, becoming thick and ridged with age. The inner bark can be peeled into long thin strips, which have been used by the Indians for basket making. **Wood** very durable, light, soft, and brittle, with an aromatic odor. Western red cedar is used for shingles, boat lumber, piling, and fish-trap floats.

Western red cedar is characterized by a conical trunk and branches curving upward at the tips. It is found in Alaska from sea level to 3,000 feet on the west slopes of the coast range, and north in decreasing amounts to approximately 57°.



 Silver fir (*Abies amabilis*). a, Seed, enlarged; b, leaves, enlarged



Western red cedar (*Thuja plicata*). a, Seed; b, cone

Alaska Cedar.

Chamaecyparis nootkatensis.

Leaves similar to western red cedar, but tinged bluish and showing the points of the tiny leaflets. **Leaf scales** more pointed and wider spread. The **cones**, which require two years to mature, are ashy gray and less than one-half inch in diameter, rounder and harder than red cedar. **Bark** ash gray and lacking the brown tinge of the red cedar. **Wood** a distinctive sulphur yellow with a sweet aromatic odor and taste, fine-grained and easy to work, extremely durable and taking a beautiful finish. Alaska cedar is used locally for cabinet work and telephone poles. Logs cut into 13-foot lengths are occasionally exported to Japan, where they are made into panels.

Alaska cedar is found scattered or in small groups with western red cedar, Sitka spruce, and western hemlock, or, on higher slopes or muskegs, with mountain hemlock. It extends from Prince William Sound east and south along the coast from sea level to timber line.

Pacific Yew.

Taxus brevifolia.

The yellow-green **leaves** are lance shaped and soft, glossy above, pale beneath. A twist at the base gives them an even comblike appearance. **Fruit** a bright red berry containing one seed. **Bark** ridged and fluted. Although the **wood** is valuable, being fine grained, elastic, and durable, it is too scarce to be commercially important.

The yew is seldom over 30 feet tall and 6 to 12 inches in diameter; usually very much smaller, with a straight conical trunk. It has been definitely identified only in the vicinity of Annette, Mary, and Gravina Islands, and southern Prince of Wales Island as far north as 55°, but it undoubtedly grows in other parts of southeastern Alaska. It is exceedingly scattered and occurs only where birds have dropped the seed. Very tolerant of shade, it grows slowly at the heads of streams and moist canyons.



Pacific yew (*Taxus brevifolia*)



Alaska cedar (*Chamaecyparis nootkatensis*). a, Seed; b, cone; c, cone, open

THE WILLOW FAMILY

Salicaceae

The willow family, comprising the willows and poplars, is characterized by tiny seeds surrounded by tufts of long white, silky hairs. The seeds are scattered in early spring.

Of the willows proper, Alaska has many species but only four are known to attain tree size. They are extremely difficult to tell apart in the field, especially in winter, although the willows as a whole can usually be identified by the bitter, quininelike taste of the bark.

Aspen.

Populus tremuloides.

Leaves smooth, shiny, pale beneath, alternate. Leaf stems 1 to 3 inches long, flattened at right angles to leaf base so that the leaves tremble in the slightest breeze. Leaf scars prominent. Twigs reddish. Male and female **flowers** on separate trees. **Fruit** light winged, maturing in early spring. Bark whitish. Trunk straight, 30 to 40 feet tall. Limbs short and irregularly bent, making a narrow domelike crown. Curved scars and black knots on the bark are characteristic. **Wood** soft, brittle, and perishable, a fine pulp wood and good box material. A fast-growing tree with short life, it seeks south slopes, well-drained benches, and creek bottoms from the Arctic Circle throughout Yukon Valley to the Bering Sea, and extends south to the north slopes of the coast range. It is also to some slight extent on the Pacific side where inlets cut into the mountains.

Balsam Poplar.

Populus balsamifera.

Leaves dark green, lustrous above, rusty brown beneath, larger and longer than the leaves of aspen. **Flowers** in long cylindrical clusters hanging conspicuously from bases of buds on twigs of previous year's growth. **Bark** deeply furrowed, gray brown. Young twigs shiny red. Buds large and sticky, covered with a pungent balsam, the odor of which permeates the air in spring. **Wood** fine-grained, soft, satisfactory for cooperage or boxes and excellent for pulp.

The balsam poplar has a straight stem and long, thin, open crown. It is seldom over 50 feet tall. It is found in river valleys and sandy bottoms from the head of Lynn Canal throughout the interior, west to 165° at Igloo on Seward Peninsula and north to a few scattered stream bottoms on the Arctic slope.



Aspen (*Populus tremuloides*). a, Winter buds; b, female flowers, c, male flowers



Balsam poplar (*Populus balsamifera*). a, Female flowers; b, winter bud

Northern Black Cottonwood. *Populus trichocarpa hastata.*

Leaves smooth, thick, shiny above, with rusty specks on the whitish undersurface. **Flowers** and **bark** similar to balsam poplar. **Wood** soft and straight grained, excellent for cooperage and pulp, but of little economic importance in Alaska.

Black cottonwood is hard to distinguish from balsam poplar as it seeks similar habitats and is of much the same general appearance. Black cottonwood, however, seems to have a smaller winter bud and slightly narrower and more lanceolate leaves with a whiter undersurface. The range also differs, as black cottonwood occurs along the coast from Kokiak Island eastward to the Stikine River where it extends into British Columbia, and is sparsely scattered along the coast southward. It is not reported in interior Alaska. The balsam poplar does not grow on the coast except where valleys penetrate the mountains.

Beak Willow.

Salix bebbiana.

Leaves ovate-lanceolate, 1 to 3 inches long, one-half to 1 inch wide, with ear-shaped, leaflike growths at the base. Male and female **flowers** on different trees. **Fruit** thin capsules produced in long tassellike clusters, the capsules liberating minute winged seeds in early spring. **Bark** thin and reddish, twigs orange red and marked by elevated leaf scars having three minute dots. **Wood** light and brittle. Beak willow is used for ball bats, charcoal, gunpowder, and withes for furniture and baskets. It is of little commercial importance in Alaska.

Sometimes a bushy tree 20 feet tall with a 6 to 8 inch trunk. Found along streams, swamps, and lakes, in wet, rich soil, from Cook Inlet east and south along the coast, forming thickets.



Northern black cottonwood (*Populus trichocarpa hastata*). a, Winter bud; b, seed pods



Beak willow (*Salix bebbiana*). a, Female flowers

Bigleaf Willow.*Salix amplifolia.*

Leaves 2½ to 4 inches long and half to two-thirds as broad, yellow green, whitish beneath, and woolly when young. Young twigs are woolly the first few years, later becoming a reddish hue.

So far bigleaf willow has been found near sea beaches and sand dunes at Yakutat Bay, Disenchantment Bay, Haenke Island, and Egg Island. It is a shrubby tree 20 feet or so in height and attains a diameter of 8 to 15 inches. Little is known of its range or habits.

Silky Willow.*Salix sitchensis angustifolia.*

Leaves 2 to 4 inches long, except on vigorous shoots, where they may reach 5 inches; grass green and shiny above with a covering of white silky hairs on the under-surface. Leaf stems and veins also hairy. **Bark** thin, red brown, scaly. Trunk rarely over 4 to 6 inches in diameter. Young twigs hairy the first season. **Wood** not used commercially. The Indians use it in drying fish as the smoke has no bad odor. The pounded bark has also been used to heal wounds.

This, the largest of Alaska tree willows, is reported from the southernmost part of coastal Alaska north and west along the coast to Cook Inlet and the eastern end of Kodiak Island. Barely 20 feet tall.



Bigleaf willow (*Salix amplifolia*). a, Female flowers



Silky willow (*Salix sitchensis*). a, Male flower; b, female flower

Feltleaf Willow.*Salix alaxensis.*

Leaves $2\frac{1}{2}$ to 4 inches long and 1 to $1\frac{1}{2}$ inches wide, yellow-green, coated with dense, white wool beneath, smooth, and slightly wrinkled above. The mid vein is yellow. **Seed** capsules in a cluster 4 to 5 inches long with top of capsules ending in a small threadlike forked tip. **Bark** dark and shiny. Young twigs covered with white hairs which they lose after a season.

Common from the northern part of southeastern Alaska west to the Shumagin Islands and found sparingly throughout the interior. West and north of Kodiak Island the only willow reported to attain tree size. It is commonly a shrub, but occasionally is 20 or 25 feet in height.

THE BIRCH FAMILY*Betulaceae*

The individual species of birch are extremely difficult to tell apart. Generally the white birch is characterized by a whitish bark, but often either Kenai or white birch has a reddish-tinged bark. This bark in all birches curls off around the tree bole.

Kenai Birch.*Betula kenaica.*

Leaves dark green above, lighter beneath, prominently veined. **Cones** a little under 1 inch long and almost one-half inch thick, not pendent. **Bark** dark brown, scaling off around the tree. Young twigs red-brown and spotted. Very little is known of the **wood** or of the habitat requirements.

Kenai birch extends along the coast on the mainland river drainages and from the head of Lynn Canal westward to Kenai Peninsula and Kodiak Island. It probably extends into the interior through passes and river valleys.



Feltleaf willow (*Salix alarensis*). *a*, Male flower; *b*, female flower



Kenai birch (*Betula kenaica*). *a*, Cone scale, enlarged; *b*, seed, enlarged; *c*, winter bud

Alaska White Birch.*Betula neoalaskana.*

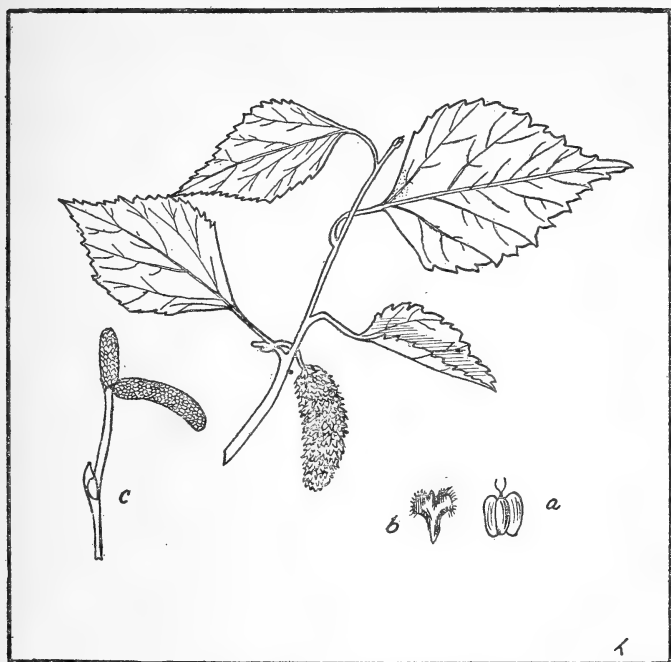
Leaves green above, lighter below. **Cones** slightly over 1 inch long and one-third inch through. The tiny seeds, or nuts, have filmy wings on two sides. The **bark** is hard and thin, whitish or reddish, and scales off around the tree. Small twigs and leaves have conspicuous resinous specks. The hard, close-grained **wood** is light red brown. It is not used very extensively in Alaska but is good for cabinet work, spools, toys, etc., and is a fair pulp wood.

Alaska white birch is common throughout the interior of Alaska to Unalakleet, about 161° west, and occurs on the south side of the coast range on the Kenai Peninsula, along Lynn Canal, and on several of the main coastal river drainages. It is found near streams and on warm slopes with moist porous soils, generally in mixture with spruce or other trees, and averages 30 feet high and 6 to 10 inches in diameter.

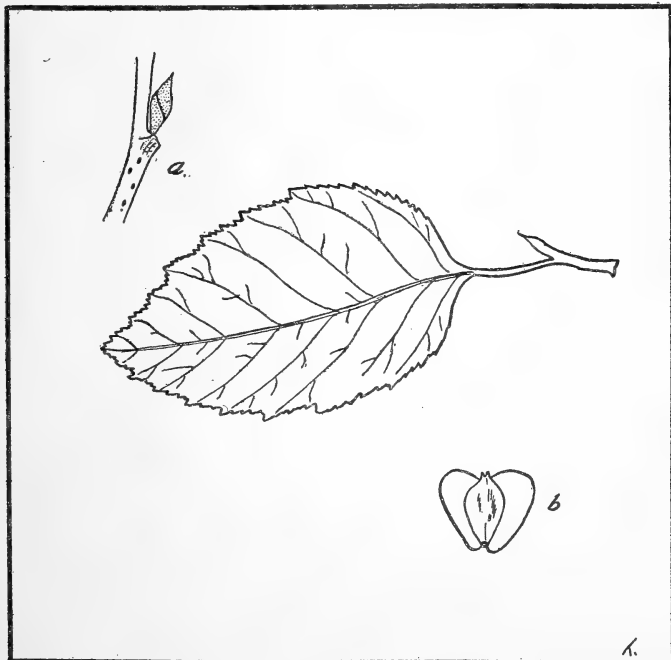
Sitka Alder.*Alnus sinuata.*

Leaves sticky when young, speckled yellow-green above, lighter below; shiny. **Cones** three-fourths inch long and three-eighths inch thick. Male **flower** clusters 3 to 5 inches long. **Bark** smooth, thin, and dark blue gray. Small twigs hairy and with resinous specks. Seeds have a thin wing. Leaf edges curl in slightly. **Wood** good for fuel and charcoal and that from larger trees used for lumber.

Little is known of the range of the Sitka alder, but it is believed to be prevalent over most of Alaska from the Arctic Circle south, growing in dense thickets from sea level to timber line. Although tolerant of shade in early life, it likes overhead light as it matures. A shrub, 4 to 6 feet high, sometimes a small tree, but ordinarily forming dense thickets.



Alaska white birch (*Betula neoalaskana*). a, Seed, enlarged; b, cone scale, enlarged; c, winter bud



Sitka alder (*Alnus sinuata*). a, Winter bud; b, seed, enlarged

Red Alder.*Alnus rubra.*

Leaves green above, pale beneath, with rusty hairs along the veins, 3 to 5 inches long. Male and female **flowers** borne on the same branch, usually partly matured the summer before they open. Male clusters 5 to 6 inches long at the end of the branchlet; female flowers smaller and farther down on the branch, developing into woody **cones** which mature and scatter seed in late fall and early spring. The trunk is straight with ashy bark splotched white in places. Spring twigs are dark with light dots. Buds, dark red, covered with scaly down.

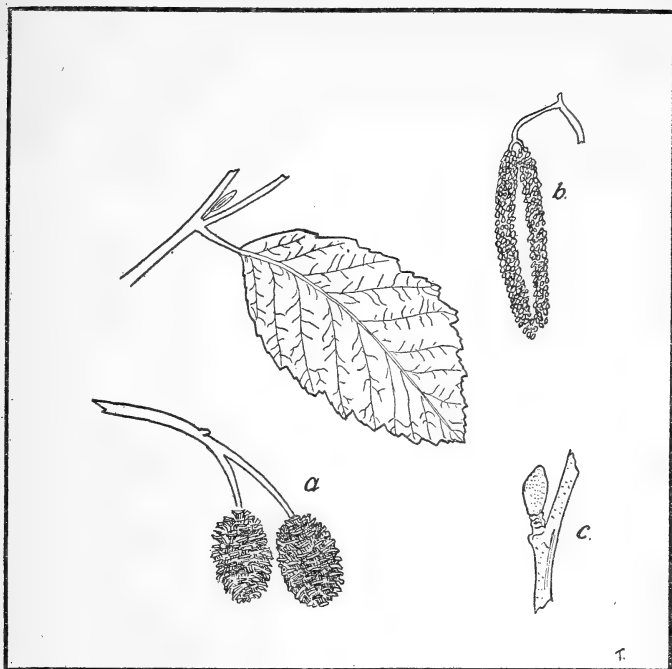
Red alder is used for furniture, shoe lasts, etc., in the States, but has little economic use in Alaska. The Indians use it in smoking meat and fish, and for wood carving.

This common alder is found throughout southeastern Alaska on stream bottoms with rich, rocky, and moist soils. Common along beaches where creeks enter the sea. It reaches a height of 35 to 40 feet and a diameter of 12 inches.

Oregon Crab Apple.*Malus rivularis.*

The **leaves** are arranged singly, never in pairs, are thick, smooth, and shiny green on top, lighter beneath and sometimes slightly hairy. Twigs are stiff and almost thorny. The **bark** is red gray, thin, and scaly. Young twigs are red and shiny. **Fruit** a typical, but small and rather acid apple. **Wood**, light brown, fine-grained, and suitable for tool handles when the tree is not too stunted to be of economic use.

The crab apple is scattered on low slopes, river bottoms, and heavy wet soils, along the Alaska coast from the Aleutians southward. It is a slow-growing tree seldom over 20 feet high, and is usually a shrub forming dense thickets.



Red alder (*Alnus rubra*). a, Cones; b, male flowers; c, winter bud



Oregon crab apple (*Malus vivularis*). a, Fruit; b, winter bud

Western Mountain-Ash.***Sorbus americana sitchensis.***

Leaves 4 to 6 inches long composed of 7 to 13 oblong oval to lance-ovate leaflets serrate above the middle, dark blue green above, pale beneath. **Flowers** one-fourth inch in diameter. **Fruit** a scarlet berry often one-half inch in diameter, formed in clusters and ripening in early fall.

Western mountain-ash occurs sparingly in southeastern Alaska but is often cultivated as an ornamental tree. It seldom exceeds 30 feet in height but has a round-topped, handsome head. Little is known definitely of its range. It may be easily distinguished from the European mountain-ash by its leaflets, which are serrate above the middle only and somewhat rounded at the ends. The leaves are composed of a smaller number of leaflets than European mountain-ash leaves, and the berries are slightly larger and in narrower clusters. The form of the tree is usually more irregular than that of the European mountain-ash.

European Mountain-Ash.***Sorbus aucuparia.***

Leaves alternate, composed of 9 to 17 lance-shaped leaflets with serrated edges, without teeth toward the base, dull green above but slightly hairy beneath, three-fourths to 2 inches long. The **flowers** are in corymbs, or clusters, 4 to 6 inches broad, each white flower being one-third inch across. **Fruit** a berry, one-third inch in diameter, bright red and ripening in August in Alaska. A round symmetrical-headed tree 20 to 40 feet high with smooth aromatic **bark**.

The European mountain-ash is found sparingly naturalized along the coast of southeastern Alaska as a domestic tree in the towns. It is an exotic species, cultivated as an ornamental tree in the United States and Canada, and is not a true ash.



Western mountain ash (*Sorbus americana sitchensis*). *a*, Leaf, life size; *b*, berries, reduced



European mountain ash (*Sorbus aucuparia*). *a*, Leaf, life size; *b*, berries, reduced; *c*, winter bud

Bigleaf Maple.*Acer macrophyllum.*

Leaves deep shiny green on top, pale beneath, 7 to 14 inches wide. Stems 6 to 12 inches long. They turn a rich red yellow when they fall. Leaf scars U-shaped, with three pits. Old trees have a rough, hard **bark** with grayish, scaly ridges. **Fruit** a pair of winged seeds, the wings $1\frac{1}{2}$ inches long and one-half inch wide. **Wood** fine-grained, hard, excellent for interior finish and turnery.

This is the only large maple in the Pacific region. It is found along the coast as far north as Ketchikan at least, but its northern limits are not known. It favors low mountain streams and river bottoms where there are rich, gravelly, moist soils. It is tolerant of shade in early life, but desires top light for long clear growth. From 25 to 30 feet tall.

Dwarf Maple.*Acer glabrum.*

Leaves are smooth and shiny on top, pale beneath. Leaf scars U-shaped, with three pits. Veins yellowish. Male and female **flowers** borne on separate trees. **Seeds** joined in pairs, a single leaf on each. Seeds are usually red until shed, when they turn a light brown. **Bark**, buds, and twigs a smooth red brown. Wood dense, hard, and heavy. The tree is seldom large enough for commercial use.

The range of dwarf maple is imperfectly known, but it is common all along the coast of southeastern Alaska to the head of Lynn Canal. It is sometimes a tree 20 to 30 feet tall and 6 to 12 inches in diameter, but more often a shrub 4 to 6 feet high.



Bigleaf maple (*Acer macrophyllum*). a, Seed, life size



Dwarf maple (*Acer glabrum*). a, Seed, life size

SIX TESTED RULES FOR FOREST-FIRE PREVENTION

1. *Making camp.*—Before building a fire, scrape away all inflammable material from a spot 5 feet in diameter. Dig a hole in the center, and in it build your camp fire. Keep your fire small. Never build it against trees or logs or near brush.

2. *Breaking camp.*—Never leave a camp until you are sure every spark of your fire is out. Stir the coals while soaking them with water. Wet the ground around the fire. If you can not get water, stir in damp mineral earth and tread it down until packed tight over and around the fire. Be sure the last spark is dead.

3. *Matches.*—Be sure your match is out. Break it in two before you throw it away.

4. *Tobacco.*—Be sure pipe ashes and cigar or cigarette stubs are dead before throwing them away. Never throw them into brush, leaves, or needles.

5. *Brush burning.*—Never burn brush or slash in windy weather or while there is the slightest danger that the fire will get away.

6. *Fire fighting.*—Put out the small fires and there will be no larger ones. If you discover a large fire do your best to get assistance.

GLOSSARY OF TECHNICAL TERMS

Compound.—A leaf of separate leaflets.

Corymb.—A flat topped or convex flower cluster.

Deciduous.—Falling in autumn.

Dentate.—Toothed.

Entire.—Without teeth.

Lanceolate.—Shaped like a lance.

Leaf stalk.—Petiole, stem of leaf.

Lobe.—Divisions of a leaf or petal.

Ovate.—Egg shaped.

Pendulous.—Hanging down.

Petiole.—Leafstalk.

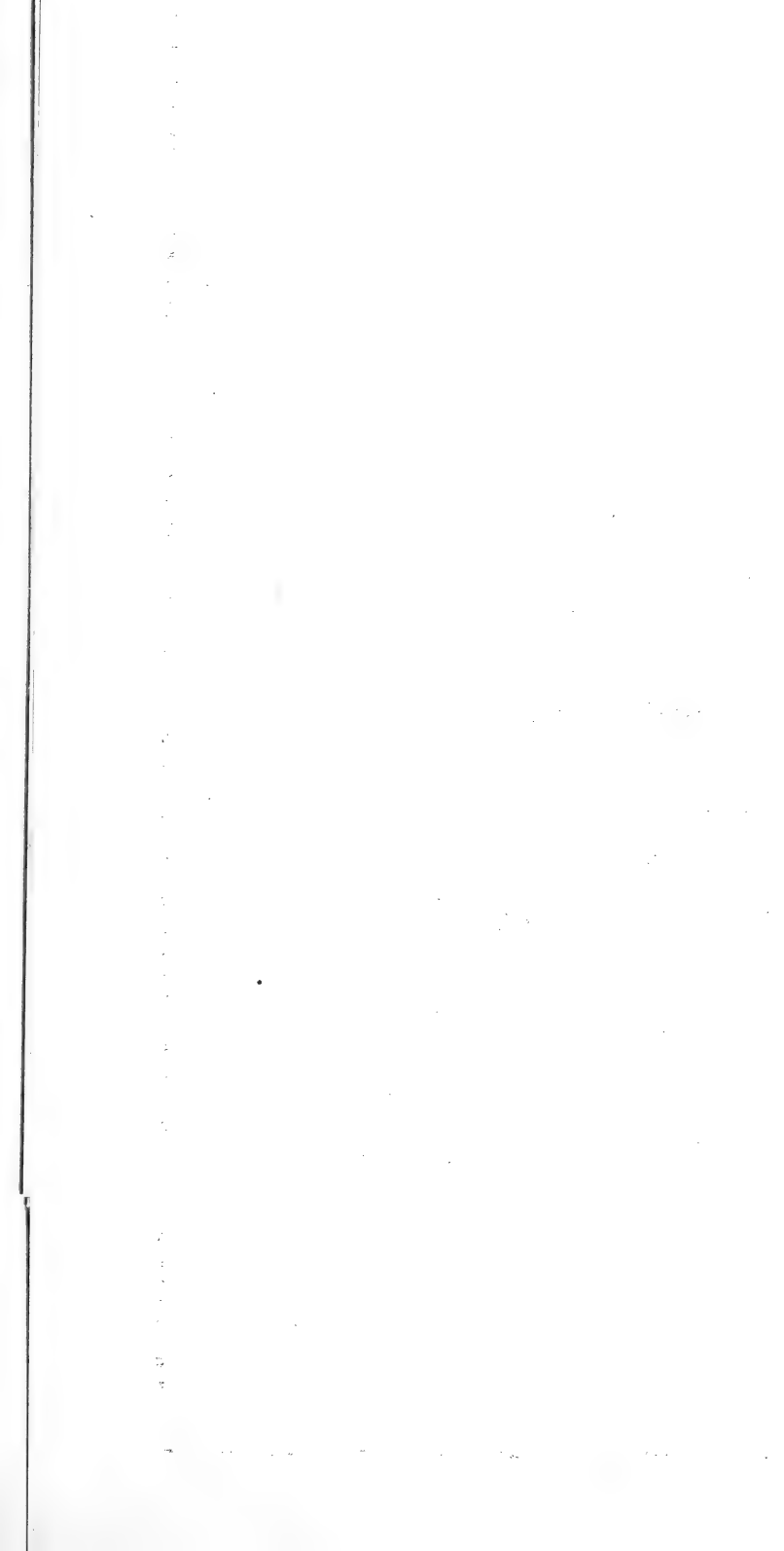
Pubescent.—Covered with hairs.

Serrate.—Having sharp teeth pointed forward.

Simple.—In one piece, not compound.







DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

MAP OF ALASKA

Compiled from available
data, from maps of the
interior and the U. S. Coast
and Geodetic Survey
and other sources.

Scale 300,000
approximately 80 miles to 1 inch

0 50 100 150 200 Miles
0 50 100 150 Kilometers

- HEMLOCK SPRUCE COASTAL FORESTS.
- SPRUCE-BIRCH INTERIOR FOREST-SPARSE.
- SPRUCE-BIRCH INTERIOR FOREST.

